AN ACADEMIC'S PERCEPTION OF THE INTERACTION OF UNIVERSITIES WITH THOSE WHO "MANAGE" (OR WOULD LIKE TO MANAGE) SCIENTIFIC ACTIVITIES

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THE PRIME RESPONSIBILITIES OF UNIVERSITIES

1. *Hand on the state of the art*
   - 1.1 Basis laws and fundamental knowledge.
   - 1.2 Expose young scientists to the way in which the scientific method, and experimentation lead to hypotheses and an appreciation that an hypothesis must be testable if it is to be useful.
2. *Advance knowledge*
   - 2.1 Probe unknown or poorly understood areas—develop new hypotheses; curiosity driven research. To uncover basic principles but to be alert to potential applications.
   - 2.2 Train scientists in this kind of research—stimulate, encourage novel ideas in young postgraduates.

Because of the long term nature of pay-offs from that work—it is *government* which will pay for this work—it is a national investment. The prime responsibility of universities is to produce graduates who have independence of thought, a heightened imagination, and the technical competence to pursue ideas and to pursue excellence in research, be it fundamental or less fundamental. But, there are other responsibilities, some relating quite closely to the management of science.

3. *Dissemination of knowledge/influence in the community*
   - 3.1 Professional societies—raising awareness of new ideas by presenting papers at conferences, and offering courses to up-date members learning about current problems which arise among practitioners, learning about the needs of professionals.
   - 3.2 Providing disinterested but informed advice to government on enquiries, standing committees, refereeing grant requests (ARGS, NHMRC), policy decisions (serve on agencies/regulatory agencies/boards). Review the scientific activities of governmental agencies.
   - 3.3 Public affairs, e.g. ABC, Hospital boards, NATA, National Standards.

Having stated how I see universities as managing science within their own sphere and in the rather wider public arena, does this leave a place for them to interact with industry?

4. *Contact with industry*
   - 4.1 Universities must remain free to offer the instruction and pursue the research they believe will best advance the science in their particular discipline.

Industry has a right to expect a thinking competent scientist, but they cannot expect scientists trained specifically for their needs. Notwithstanding that view, I do believe it is possible to find many research projects which are of mutual interest to university and industry. Here the benefits flow directly to industry and industry needs to be more prepared to pay than seems to have been the case in the past. Industry/university interactions can take the form of:

- 4.2 Consultancies with industry.
- 4.3 Joint research projects in the forms of: Funds from industry (contract research), research at university; Staff from industry, research at university; Staff from university, research in industry; Purchase of time and skills on expensive equipment; Problem solving with industry ad hoc and associated with innovation.

What criteria make such work appropriate for a university? It may be undertaken because:

(a) it has a significant element of investigation (along with more routine aspects);
(b) the work funds the purchase of a facility which enables the Department as a whole to benefit, although the work itself may not be highly fundamental;
(c) it provides flexible funds to a research group in return for sharing the rights with the industry to exploit the application of any research findings sponsored by industry;
(d) by providing funds from routine analysis (for example), a Department may be able to employ a technical assistant or buy a better piece of equipment; and,
(e) it allows university and industry to share in the application of research findings.

I believe the benefits from such associations are significant.

Certainly academics can do with an increased awareness of industrial activities. Academics should be aware of the following about industry:

(a) what it would like to do;
(b) what it is doing less well than is possible with the application of current knowledge;
(c) what it might do with ideas, if it (industry) knew they existed; and,
(d) where industry is experiencing problems.

The lack of awareness by industry of the expertise in universities and CAEs is also a real concern, especially in industries where either they don't have a Research and Development Department at all, or it is very small.